or India, the following table is the result (omitting average conditions):—

Agreement between Oxford and	Years of simultaneous excess	
	High pressure	Low pressure
Cordoba ...	1874 ...	—
,, ...	1875 ...	—
,, ...	— ...	1877
India ...	— ...	1878
,, ...	1880 ...	—
,, ...	— ...	1882
,, ...	1884 ...	—
,, ...	— ...	1886
Cordoba ...	1893 ...	—
,, ...	— ...	1895
India ...	1896 ...	—
,, ...	1899 ...	—

It will be seen that there is a very even balancing between Cordoba and India. A most interesting point is that the Oxford curve seems to favour for series of years the two main pressure types alternately. From 1900 the type of variation seems somewhat indefinite.

This table seems to suggest that during some years the British area is enveloped in the pressure system that extends over the large region in which India is about the centre, while for another series it is dominated by the antipodal pressure system of which South America is the middle portion.

It is possible that it is this alternate reversion from one type to the other that prevents the 3·8-year change of the Indian and Cordoba curves from occurring in the British curves, and substitutes for it an apparent shorter period of about three years, which is very noticeable for some series of years in the British curves (Fig. 2, curve i.).

It will thus be seen that it is difficult at present to forecast British pressure correctly, but further research will very probably render it possible when more is known about the mechanism of the atmosphere.

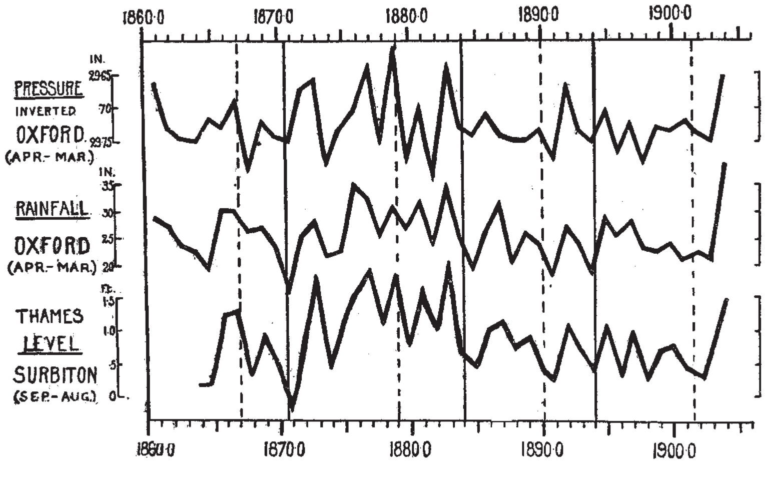

Fig. 3.—Curves to show the similarity between the flow of the Thames and the rainfall and pressure (inverted) changes at one station, namely, Oxford.

In conclusion, it is interesting to note that in addition to this short period variation the curves (Fig. 2) indicate one of longer duration. An examination of these statistics, when the curves are smoothed by taking three-year means to eliminate the short period changes, shows that when the river flow was greatest, *i.e.* between about the years 1873–1883, the rainfall was highest and the pressure lowest, which is exactly what was to be expected from the relationship between pressure, rainfall, and river flow in these islands. Another point here indicated is that this long period change is real, and that there is a tendency now for the low river levels, deficiency of rainfall, and excess pressure of the last decade or more to be replaced by a greater mean flow of the river, increase in the rainfall, and a diminution in the barometric pressure. William J. S. Lockyer.

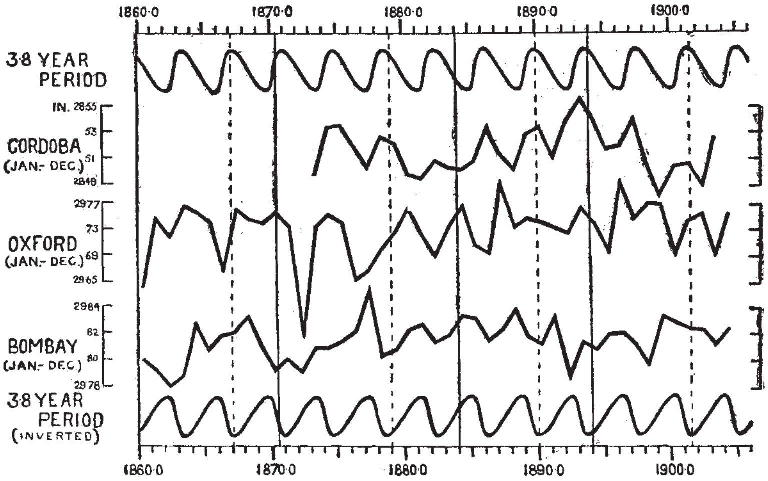

Fig. 4.—Curve to illustrate the relation between the British (Oxford) pressure change and those of India (Bombay) and S. America (Cordoba).

NOTES.

A Royal garden party was held on Wednesday, June 14, and was attended by about six thousand guests. At the end of the official record of notable people present, supplied to the *Times* by the "Court Newsman," we read:—"Invitations were issued to their Excellencies the Foreign Ambassadors and Ministers, with the *personnel* of their Embassies and Legations, the members of the Government, the Households of the King and Queen and of the Royal Family, and to many peers, members of Parliament, naval and military officers, clergy, and representatives of the musical, dramatic, and literary professions, many of whom with their wives and daughters were present at the party." We believe His Majesty the King is interested in the scientific as in the other activities of his subjects; but if so, it is clear that he is very badly served by the Lord Chamberlain's office, which is responsible for the issue of the invitations. Apparently, this department of the State has not yet realised that science is the only true basis of a nation's welfare and progress, and that scientific men exist in Britain. A few of the most distinguished Fellows of the Royal Society would represent the best interests of the nation even more effectively than actors and musicians.

The Royal Society's annual conversazione, to which ladies are invited, will take place on Friday, June 23.

Prof. E. Ray Lankester, F.R.S., has been elected president of the British Association for the meeting to be held at York next year.

The Stephen Ralli memorial—a laboratory for clinical and pathological research—will be opened at the Sussex County Hospital, Brighton, on Thursday next, June 29.

At the Borough Polytechnic Institute on Wednesday next, June 28, marble busts of Joseph Lancaster and Michael Faraday (the work of Mr. H. C. Fehr), presented to the institute by Mr. Passmore Edwards, will be formally unveiled by Prof. S. P. Thompson, F.R.S. Mr. Edric Bayley, chairman of the governors, will preside.

The annual conversazione of the Royal Geographical Society will be held at the Natural History Museum, South Kensington, on Tuesday next, June 27.

At the meeting of the Royal Geographical Society to be held in the evening of June 26, a paper will be read by Dr. Charcot on the French Antarctic Expedition. Dr. Charcot has just been created a Chevalier of the Legion of Honour.

We learn from the *Times* that the Government of India has ordered the introduction of a standard time, with effect from July 1, on the railways (other than small local lines, where the change might be inconvenient) and in all telegraph offices in the country, and also in Burma. Hitherto Madras time has been adopted by most of the Indian railways. The standard now to be introduced is nine minutes in advance of the "railway time," as it is called in all parts of India, and is thus 5½ hours in advance of Greenwich, being the local time of longitude 82° 30′. The standard for Burma is to be exactly an hour earlier, viz. 6½ hours in advance of Greenwich and five minutes earlier than Rangoon local time. In inland places it has been found convenient generally to follow railway time; but the great seaports of Calcutta, Bombay, and Karachi have followed the local time of their respective longitudes. The Government of India does not prescribe the new standard for these and other places following local time, but if a general desire to adopt the new standard is evinced, the Government will be prepared to support the change and to cooperate in bringing it about. In all probability, therefore, there will, ere long, be a uniform time throughout India exactly 5½ hours in advance of Greenwich, while that of Burma will be 6½ hours in advance.

The death of Mr. James Mansergh, F.R.S., on June 15, at seventy-one years of age, deprives applied science of an acknowledged authority upon water supply and sewage disposal. Mr. Mansergh had unique experience and knowledge of these subjects, and was associated for many years with almost every important construction connected with them in this country. The extensive schemes which he initiated and directed for the improvement of water supply and drainage will long remain as monuments to his memory. He was the designer of the waterworks and sewerage of Lancaster (where he was born in April, 1834), Lincoln, Stockton, Middlesbrough, Rotherham, Southport, Burton-on-Trent, Melbourne (Australia), Birmingham, and many other large towns. These designs include some of the largest schemes of water supply and drainage ever carried out, such, for instance, as the sewerage scheme for the metropolitan district of Melbourne, embracing an area of 133 square miles, and the supply of water to Birmingham from a source in Radnorshire seventy-three miles away. This scheme utilises water from the rivers Elan and Claerwen, and natural reservoirs have been formed for the water by constructing immense dams below the point where the two rivers meet. Mr. Mansergh was the author of about 150 reports upon schemes of water supply, sewerage, and sewage disposal for many large towns. He was also the author of "Lectures on Water Supply: Prospecting for Water, Prospecting and Boring," delivered at the School of Military Engineering, Chatham, "The Water Supply of Towns," and other works. While president of the Institution of Civil Engineers in 1900–1, the Engineering Standards Committee was formed, and Mr. Mansergh was elected chairman. At the time of his death, as chairman of the main committee, he had more than thirty committees working on standardisation in different branches of engineering. Mr. Mansergh was a member of the Royal Commission on Metropolitan Water Supply, and he was on the council of the Institution of Mechanical Engineers. He was elected a Fellow of the Royal Society in 1901 for his eminent work as a hydraulic engineer.

In the *Irish Naturalist* for June Dr. R. F. Scharff records the capture of two female bottle-nosed dolphins in Dublin Bay in April last. The only other record of the occurrence of *Tursiops tursio* in Irish waters dates from 1829. Dr. Scharff figures one of the Dublin specimens.

We have received a copy of the March issue of the Bulletin of the Cracow Academy, to which Mr. V. Kulczyński contributes the continuation of an article on certain spiders, treating in this instance of *Araneus curcubitinus* and its allies. In other articles Mr. T. Browicz discusses the secreting function of the nucleus in the cells of the liver, while Mr. K. Wójcik describes the infra-Oligocene strata of Riszkania, near Uzsok, with lists of the fossils.

A noticeable feature in the report of the Zoological Society of Philadelphia for the past year is the attention paid to the causes of the deaths which take place in the menagerie. In 140 instances a pathological examination was instituted, mostly with definite results in determining the cause of decease. The results are tabulated, and show that tuberculosis is by far the most fatal ailment, next to which comes inflammation of the stomach and intestines, followed, with a considerable diminution in the numbers, by nephritis, necrosis of the liver, and non-tubercular pneumonia.

In the April issue of the *Emu* the editors continue the excellent practice of giving coloured illustrations of some of the more remarkable Australian birds, the plate, which is drawn by Mr. H. Grönvold, depicting in this instance representatives of Xerophila, Mirafra, and Amytis. In the case of *Xerophila castaneiventris,* one cannot help wondering what is the purpose of the pair of yellow eye-like spots at the root of the beak. Among the articles is an interesting account, with photographs, by Mr. A. J. Campbell, one of the editors, of that remarkable bird the kagu of New Caledonia, in the course of which attention is directed to the danger of extermination now threatening that species. Thirty years ago it had already disappeared from the more settled parts of Caledonia, and the writer urges that steps should be taken, while there is yet time, to preserve such an interesting bird (the sole representative of its genus) from extermination.

The problems of "vitalismus" are discussed by Mr. K. C. Schneider, of Vienna, in *Biologisches Centralblatt* of June 1 at considerable length; while in another article Dr. H. Schmidt, of Jena, enters on the consideration of the fundamental law of biological development. In a third communication Dr. R. Rössle insists on the importance of immunity-reactions (that is to say, serum reactions and blood-immunity) in determining the systematic affinities of the higher animals, pointing out that by this method the intimate affinities respectively existing between fowls and pigeons, horse and ass, fox and dog, and sheep and goats, have already been established. The translation of an article by Prof. Marcus Hartog, published in the *Proceedings of the Royal Society,* constitutes the next most important part of the contents of this issue.

THE most important articles in *Indian Public Health* for May (vol. i., No. 10) deal with the milk question in India and the Calcutta milk supply.

SOME interesting observations on the influence of the root nodules upon the composition of soy beans and cowpeas have been made by Messrs. C. D. Smith and F. W. Robison (Bulletin No. 224 Michigan State Agricultural College Experiment Station). The conclusion is arrived at, after two years' work, that while on fairly fertile soils the root nodules may not notably increase the yield, they do cause an important and pronounced increase in the relative and absolute amount of nitrogen in the plants.

BULLETIN No. 23, by Dr. Herzog, of the Bureau of Government Laboratories, Manila, is devoted to a consideration of plague, and a description of the pathological findings in twenty cases which occurred in Manila. A new species of rat flea (*Pulex philippensis*) is described. Bulletin No. 24, by Dr. Wherry, gives a report of two cases of human glanders which occurred in Manila, and some notes on the bacteriology and morphology of the *Bacillus mallei.*

IN the *Bull. Internat. de l'Acad. des Sciences de Cracovie* (No. 1, January) M. Panek contributes a chemical and bacteriological study of the Polish "barszcz," a product of the fermentation of red beetroot. It is brought about by a micro-organism, named by the author *Bacterium betae viscosum,* which causes a fermentation of the canesugar with the production of viscous substances and mannite. M. Tochtermann describes the action of thionyl chloride on thiobenzamide, M. Niemczycki discusses syntheses effected by means of zinc chloride, and Madame Krahelska the merogonic development of the egg of *Echinus microtuberculatus.*

THERE has been a considerable amount of uncertainty with regard to the blackwood of southern India, whether it was possible to distinguish two species. Mr. T. E. Bourdillon, writing in the *Indian Forester* (March), is able to show that *Dalbergia sissoides* and *Dalbergia latifolia* should be regarded as distinct species. The natives recognise dark blackwood, species latifolia, and pale blackwood, species sissoides, and although there are several points of distinction, the wood forms the best means of identification.

To the Cowthorpe oak which grows near Wetherby, in Yorkshire, and was illustrated in NATURE of May 11 (p. 44), is generally assigned the honour of being the largest tree in the British Isles. The claim is based upon the girth and spread of the tree, as it is doubtful whether it ever attained a great height. The *Yorkshire Herald,* May 29, provides an illustration, reproduced from a painting, which is believed to be an accurate representation of the tree as it appeared sixty years ago, and extracts are given from a pamphlet issued with the picture. There is no doubt that this oak passed through its seedling stage several centuries ago; Dr. Jessop, in 1829, suggested an age exceeding 1500 years, but this is mere conjecture, as the tree has been hollow for at least two centuries.

THE eighteenth and latest volume of the *Transactions of the Royal Scottish Arboricultural Society* contains the accounts of the society's meetings during 1904, the jubilee year. The president, Mr. W. S. Fotheringam, in reviewing the progress of the society, announced that the list of members had reached a thousand. The yearly excursion which was held in France provided an opportunity of visiting some of the magnificent State forests. At Champenoux and Haye the forests are principally oak, but beech and hornbeam are also grown, since they provide useful cover. Previously the system adopted was coppice-with-standards, but in both cases this is being converted into high forest. A very fine forest of silver-fir worked with a rotation of 144 years was inspected at Celles, in the Vosges.

PROF. E. WIEDEMANN, of Erlangen, sends us a short statement of observations described in his work on electric discharges (*Wied. Ann.,* xx., p. 793, 1883) relating to the effects referred to by the Rev. F. J. Jervis-Smith in our correspondence columns on May 4 (p. 7). He agrees with Mr. Jervis-Smith as to the action of ozone, and advises persons who work for a long while with influence machines not to have these machines situated in the working room. "Ozone belongs to the poisonous gases and is the more dangerous, since the injurious effects are not manifest at the time; on the contrary, breathing the gas produces at first a feeling of exhilaration, but afterwards it has a depressing effect on the nervous system. Binz has shown that it may cause sleep. I may add to what I have mentioned that during my observations I have suffered somewhat severely from nervous disturbance (hyperasthesia of the feet) due to breathing ozone. These lasted for one or two years. Moreover, I always experience discomfort after performing experiments in my lectures on Tesla discharges."

SINCE March, 1904, several meteorological stations have been established by the Japanese Government along the coast of Korea. In April of that year the Japanese meteorological observatory in Chemulpo commenced to record observations. Mr. H. Mukasa, writing from Chemulpo, informs us that a new building for the observatory was completed lately on the top of the highest hill in Chemulpo (lat. 37° 29′ N., long. 126° 37′ E.), seventy metres above mean sea-level, where observations have been taken since January 1 last. At the invitation of Dr. Y. Wada, the director, the important residents of Seoul and Chemulpo visited the observatory on March 25 last. Various pieces of apparatus relating to meteorology, as well as the horizontal seismograph devised by Prof. F. Omori, were exhibited. Among the visitors were the Japanese, French, and British Ministers, and several Korean dignitaries. The exhibition succeeded in arousing the interest of the visitors in meteorology, and made a deep impression on the Korean guests.

WE have received a copy of the first report of the Transvaal Meteorological Department, containing observations for one year ending June 30, 1904, with an appendix giving monthly and seasonal rainfall records for a number of years, from observations taken before the establishment of the meteorological department. This was only constituted in April, 1904, consequently the records are very incomplete, so far as official stations are concerned. In some cases a complete year's observations are published, thanks to the courtesy of volunteer observers. The department has, however, lost no time in obtaining properly verified instruments, but the difficulties may be gathered from the fact that out of two consignments of grass minimum thermometers only one instrument survived the transport. The heights of the stations are not yet accurately known; many of them have an altitude of 5000 feet to 6000 feet.

THE thirteenth yearly report of the Sonnblick Society for the year 1904 contains an interesting account of some of the results obtained at the highest mountain meteorological stations of Europe, with photographic illustrations; the arduous work done in the interest of meteorological and physical science at some of these inhospitable localities has from time to time been referred to in our columns. In the present report A. Edler von Obermayr discusses the frequency of sunshine at the summit of the Sonnblick (3106 metres) with that at other mountain stations. The tables exhibit some peculiarities:—on Ben Nevis the greatest frequency occurs in June, on the Obir and Säntis in July and August, but on the Sonnblick the greatest frequency occurs exclusively in the winter months, from November to February. A useful index is given in a separate paper of the various items and unusual occurrences contained in the Sonnblick reports for the twelve years 1892–1903.

IN his earliest researches on the properties of gaseous fluorine, M. Henri Moissan showed that it reacted vigorously with nitric acid, fluorine and the vapour of the acid producing a violent explosion. In the current number of the *Comptes rendus* MM. Moissan and Lebeau give an account of a systematic research on the reactions between fluorine and the compounds of nitrogen and oxygen. Nitrogen peroxide and nitrous oxide proved to be perfectly indifferent towards fluorine, but a lively reaction, accompanied by flame, was found to take place between fluorine and nitric oxide. With the nitric oxide in excess, the gaseous products proved to be nitrogen, nitric oxide, and nitrogen peroxide, the fluorine appearing in the form of a solid product of indefinite composition containing platinum (from the tube by which the gas was led in) and nitrous compounds. But with the fluorine in excess, the reaction appeared to be more definite, and a gaseous compound containing fluorine, nitrogen, and oxygen was produced, the substance being solid at the temperature of boiling oxygen. This solid, when allowed to boil off, could be condensed to a colourless liquid at −80° C., and further work is being carried out with the view of establishing its composition and properties.

A SHORT report has been received upon the present state of the work done in connection with the "Technolexicon" of the Society of German Engineers. In the compilation of this universal technical dictionary for translation purposes (in German, French, and English), which was commenced in 1901, about 2000 firms and individual collaborators are assisting at present. Up to now 2,700,000 word-cards have been collected; and this number does not include hundreds of thousands of cards that will result from the working out of the original contributions not yet taken in hand. The editor-in-chief of the "Technolexicon" is Dr. Hubert Jansen, Berlin (NW. 7), Dorotheenstrasse 49, and he will be glad to give any information concerning the work.

A KEY to the first part of "A New Trigonometry for Schools," by Mr. W. G. Borchardt and the Rev. A. D. Perrott, has been published by Messrs. Geo. Bell and Sons.

OUR ASTRONOMICAL COLUMN.

STARS WITH PECULIAR SPECTRA.—Mrs. Fleming has discovered several more new variable stars and other objects having peculiar spectra whilst examining the Henry Draper memorial plates. The designation, position for 1900, magnitude and spectral peculiarities are given for each of these in No. 98 of the Harvard College Observatory Circulars. Several of the objects mentioned have bright lines in their spectra, and one or two call for special remark. For example, a star in Cepheus at R.A. = 0h. 7·6m., dec. = +71° 32′, was found to have a spectrum containing five bright bands at λλ 3869, 4101, 4340, 4688, and 4861. The first of these coincides with the bright band seen in certain gaseous nebulæ, the second, third, and fifth will be recognised as due to hydrogen, whilst the fourth, the brightest of all, corresponds to the characteristic line seen in fifth-type stars. The chief nebula line at λ 5000 was not seen. Prof. Pickering suggests that this object may have arrived at an intermediate stage between a nebula and a fifth-type star.

Another star situated in the position R.A. = 1h. 50·2m., dec. = +62° 49′, in the constellation Cassiopeia, is now classed as a gaseous nebula, its spectrum consisting of the chief nebula line at λ 5000.

A second table in the same Circular describes the spectra of twenty-one known variables, and Prof. Pickering states that in most cases of long-period variables the bright hydrogen lines are not seen during the epochs of minima.

VARIABLE STARS IN THE CLUSTERS MESSIER 3 AND 5.—The hundredth Harvard College Circular contains a discussion by Prof. Bailey of the variable stars discovered in the clusters Messier 3 and Messier 5. These two clusters contain a greater proportion of variable stars than any other hitherto examined. Of every seven stars in the former one is a variable, whilst in Messier 5 the ratio is 1 : 11. Periods have been determined for most of the variable stars, and their similarity is remarkable. Only two stars, Nos. 42 and 50 in Messier 5, having periods of 25·74d. and 105·6d. respectively, appear to depart from the rule, all the other variables in both clusters having periods differing but little from 13h. The average deviation from the mean (13h.) in Messier 3 is 1h. 0m., and in Messier 5 (mean 12h. 45m.) 1h. 13m. All the variables are of nearly the same magnitude, varying from 13·0m. to 16·0m., and there is a slight suggestion that the periods of them undergo a secular variation in length.

SPECTROHELIOGRAPH RESULTS.—In No. 4, vol. xxi., of the *Astrophysical Journal*, Mr. Phillip Fox, of the Yerkes Observatory, discusses the observations made with the Rumford spectroheliograph during 1904. The plates secured with the H_2 radiation, *i.e.* the radiation of the centre of the H calcium line, show a decided increase of activity in the flocculi over that observed during 1903, and are being measured in order to determine the solar rotation period at the height, above the photosphere, of the high-level flocculi.

Many series of plates, on which the individual exposures were made at intervals of a few minutes, the successive settings of the secondary slit being made in ten or twelve steps from λ 3952·4 to λ 3968·6, were secured, and Mr. Fox briefly discusses these in regard to the distinction between faculæ and flocculi in the calcium vapour images. Such a series of photographs, taken on August 25, is reproduced on one of the plates accompanying the paper, and shows that few, if any, flocculi appear in the high levels without their bases appearing, although usually diminished, in the lower levels. Even the bright patches designated "eruptions" by Messrs. Hale and Ellerman can be traced as such as far down as the photograph taken with the secondary slit set at λ 3967. The photographs secured with the hydrogen radiations $H\beta$, $H\gamma$, and $H\epsilon$ generally show flocculi coincident with those seen on the calcium photographs, and in nearly all cases where the eruptions could be traced to the limb associated prominences were discovered above the flocculus.

No prominences of great height or unusual form were photographed on the limb during 1904, but some of the plates show a fair number, and one or two beautiful examples are reproduced on the second plate of the paper.